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Hondo Judd
Environmental compliance administrator
Gilbert, Arizona

Arizona utility's collections
system grew faster than
inspectors could ensure quality,
but the town has taken control
with strong asset management

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Abel Martinez uses a RIDGID NaviTrack locator to mark the path of a damaged sewer line in Gilbert, Arizona. (Photography by Mark Henle)

CATCHING UP TO THE BOOM

Arizona utility's collections system grew faster than inspectors could ensure quality, but the town has taken control with strong asset management

By *Peter Kenter*

The population of Gilbert, Arizona, has skyrocketed from under 6,000 in 1980 to more than 240,000 today. That growth required rapid construction of wastewater infrastructure, but the municipality found itself overwhelmed as growth outpaced its ability to set new building standards, amend building codes and properly inspect new construction.

In the years since, developing a solid life cycle

asset management program has allowed the town to take stock of its infrastructure, budget to repair existing defects and bring much needed oversight to new construction.

Environmental compliance administrator Hondo Judd says the home-building boom from 2008 to 2013 was

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— Hondo Judd

(continued)

“We were always fighting fires as we discovered these defects. We needed to become more proactive.”

– Hondo Judd

the most challenging period in the town’s wastewater system development.

“We were processing more than 1,000 building permits a month,” says Judd, who joined the utility in 1995 and served as Wastewater Division field supervisor from 2000 to 2014. “We ranked among the top 10 fastest-growing municipalities in the nation, but that expansion didn’t occur without growing pains. A lot of infrastructure was put into the ground wrong — contractors couldn’t

put it in the ground fast enough for their customers. At the same time, much of it was put into service without proper inspection due to limited resources available to the city inspection department. In some cases, road inspectors or water system inspectors were called in to inspect wastewater infrastructure that wasn’t in their area of expertise. After the infrastructure was commissioned, we would take it over for operation and maintenance, including deficiencies.”

Gilbert’s collections system encompasses 879 miles of gravity sewers and 27 miles of force main, with pipes ranging between 6 and 42 inches in diameter. Gravity sewers are primarily SDR 35 PVC, with the remainder made of HDPE. Force mains are made of C900 PVC, glass-lined ductile iron, concrete-lined ductile iron and a little clay.

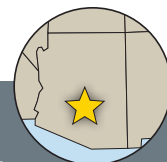
About 2 miles of force main made of concrete-lined ductile iron are currently being replaced because of hydrogen sulfide corrosion. “It should have been specified as C900 PVC, but this was a developer-driven project and the only involvement the town had was startup and training for us to operate and maintain,” Judd says. “Overall, our wastewater infrastructure is in good shape because it’s so new. However, there is still stuff that needs attention simply because it wasn’t installed properly.”



Abel Martinez (top) and Jamie McNamara use a RIDGID SeeSnake to locate a problem in a small-diameter sewer line.



Jamie McNamara (center) and Jeff Boll (right) of the Town of Gilbert clean a sewer line with a Vac-Con jet/vac truck after excavating around a damaged section of pipe.



PROFILE:

**Wastewater Division,
Public Works,
Gilbert, Arizona**

YEAR ESTABLISHED:
1965 (wastewater)

POPULATION SERVED:
243,000

AREA SERVED:
73 square miles

**DEPARTMENT STAFF (WASTEWATER
COLLECTIONS, LIFT STATIONS):**
21

INFRASTRUCTURE:
Sewer — 879 miles gravity/
27 miles force main, 17,713 manholes,
61 air release valves, 15 lift stations;
water — 1,297 miles

**ANNUAL DEPARTMENT
OPERATING BUDGET
(WASTEWATER COLLECTIONS):**
\$7.6 million

WEBSITE:
[www.gilbertaz.gov/departments/
public-works/water/wastewater](http://www.gilbertaz.gov/departments/public-works/water/wastewater)

“By developing cost assumptions, we could properly budget for inspection and maintenance against the cost of doing nothing.”

– Hondo Judd

The division took steps in 2008 to press for new standards for contractors and better communications with inspectors.

“We were seeing sanitary sewer overflows because contractors left mechanical plugs in the line, or just cut the plugs and let them flow down the pipe until they got stuck,” Judd says. “We changed the requirements so that contractors had to map out the infrastructure they installed and identify the locations of plugs. We also opened lines of communication, so that inspectors would provide us with CCTV video of pipe inspections so we could provide secondary approval.”

Contractors were also made fully responsible for defective work.

“The builders knew that if the belly of the pipe didn’t meet our standards they would have to dig it out and replace it,” Judd says. “That alone has improved work quality significantly.”

By 2013, the department developed an asset management program to determine what was in the ground already and what shape it was in. “We were always fighting fires as we discovered these defects,” Judd says. “We needed to become more proactive.”

The program consisted of five steps: taking inventory, prioritizing assets, developing an asset management plan, implementing the asset management plan, and reviewing and revising the asset management plan. The entire plan was completed within existing budgets, using no outside contractors.

Taking inventory

The division took existing maps and ensured that infrastructure was accurately represented. Crews located manholes, air-release valves, lift stations, flowmeters and valves. They also located sanitary sewer lines and force mains, and correctly identified pipe material and flow direction. All infrastructure was mapped using ArcGIS by Esri. Infrastructure was also inspected for obvious defects (see sidebar).

“Any discrepancies were redlined and marked for updating,” Judd says. “We had to develop a good relationship with the town’s GIS department to include all of the additional information we were bringing in.”

Prioritizing assets

Each asset was inspected to determine conditions most likely to negatively affect them. “Based on those conditions, we could decide what should be replaced, repaired, cleaned or rehabbed and what those actions would cost,” Judd says. “We also rated the importance of those assets. For example, those assets that would affect hospitals, schools and parks received higher priority.”

The department redesigned inspection forms for each type of infrastructure, to collect the most important information about that asset. For example, a wet well inspection form asks crews to rate each component on a scale of one to five:

- 1-Failure: Immediate replacement
- 2-Poor/Very Poor: Needs to be replaced this year
- 3-Fair: Evaluate in two years
- 4-Good: Evaluate in five years
- 5-Excellent: Evaluate in 10 years

Work order software supplied by Lucity was customized to dovetail with the inspection forms.



Casey Sanchez removes a Flygt dry well pump for repair at the Town of Gilbert's Crossroads Lift Station. The employees wear BW Technologies Gas Alerts for safety.

The department operates two sewer cleaning trucks — one Vac-Con and another from Clean Earth. It also operates two CUES CCTV camera systems. The equipment played an important role during the inspection phase.

Crews were also called on to perform critical repairs uncovered during inspection. In-house crews perform all repairs requiring excavations 14 feet deep or less, which don't require engineering approval for shoring. Crews also perform manhole rehabilitation, but outsource CIPP.

Making assumptions

The department created life cycle assumptions for each asset.

"We tried using industry standards to determine the life expectancy of the asset, and the costs associated with extending the life of that asset, either through full replacement or rehabilitation," Judd says. "In the wastewater system you never know what is coming down the pipe. There are so many contributors ranging from residential, commercial, industries and restaurants."

THE TRUTH BELOW

An important part of any asset management program is thorough inspection and listing of defects. The town of Gilbert, Arizona, embarked on such a program in 2013.

"We believe that contractors want to do good work," says Hondo Judd, the town Wastewater Division's former field supervisor. "However, with inspectors stretched to their limits and contractors meeting tight deadlines, they didn't always hit all the marks."

Among the discoveries of inspection crews:

- Manholes full of construction debris, including chunks of concrete and plywood
- Pipes containing plugs
- Pipes not cut properly after installing a manhole, leading to overflows
- A manhole filled with leftover pea gravel, concrete and rebar
- Cross bores through gravity lines

"In many cases we were finding manholes well below grade," Judd says. "We had to use quite a few new collars, concrete rings and complete inserts to bring everything back up to grade."

The department made educated assumptions based on actual experience, and compared them to information collected by other municipalities. The figures also included the expectation of full replacement with or without maintenance.

“Prior to this, we were paying for unexpected infrastructure work out of our operations or contingency budget,” Judd says. “By developing cost assumptions, we could properly budget for inspection and maintenance against the cost of doing nothing. For example, lift station pumps were expected to last four years without maintenance, and 12 years with maintenance. We assumed a future pump replacement expenditure of \$117,000 and could balance those costs against a regimen of quarterly inspection and cleaning, and scheduled pump motor oil changes and pump seal and ring replacement.”

One of the most important pieces of the asset management plan was establishing how much money would be required each year to efficiently maintain the wastewater system. Based on such assumptions, for example, the department is working toward a benchmark of cleaning the entire system every four years, and inspecting the entire system via CCTV every five.

Implementing an asset management plan

Implementation of the plan includes securing actual funding to carry out objectives for all projects, both current and capital.

Certain assumptions were also written into the local building code. For example, epoxy coating was assumed to add 15 years to the life of each new manhole. The average cost of epoxy coating was estimated at \$5,000 to \$20,000 against full replacement costs of \$35,000. As of 2010, all manholes connected to sewer pipes 12 inches in diameter or larger must be coated with epoxy or composite prior to acceptance.

Judd also worked with other departments to extend asset life. For example, the department responsible for city streets has now cautioned maintenance contractors to be more careful with manhole lids, which were sometimes handled roughly, tearing the epoxy coating and voiding warranties.

Revising the plan

The department aims to revisit the plan annually and conduct a deep review every five years.

“Operating a wastewater system, you don’t have the luxury of sitting on the sidelines and hoping for the best,” Judd says. “We’ve crossed a lot of bridges and broken down silos. Today we are more confident that we can make better operational decisions, have a more thorough knowledge of our system and can allocate funds to capital projects that meet the true needs of the system.” ♦

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